The information and statistics set out in this section and other sections of this document were extracted from the Frost & Sullivan Report, which was commissioned by us, and from various official government publications and other publicly available publications. We engaged Frost & Sullivan to prepare the Frost & Sullivan Report, an independent industry report, in connection with the **[REDACTED]**. *The information from official government sources has not been independently verified by us, the Sole Sponsor,* **[REDACTED]**, *any of their respective directors and advisers, or any other persons or parties involved in the* **[REDACTED]**, *and no representation is given as to its accuracy. Nevertheless, the Directors and Sole Sponsor have exercised reasonable care in selecting and identifying the named information sources, compiling, extracting and reproducing the information, and ensuring no material information has been omitted.*

SOURCES OF INFORMATION

We commissioned Frost & Sullivan, an independent consulting firm, to conduct a detailed research on the life science tool market from 2020 to 2030. The report commissioned has been prepared by Frost & Sullivan independent of our influence.

Frost & Sullivan is an independent global consulting firm founded in 1961 that provides industry research, market strategies and growth consulting and corporate training. Its industry coverage includes automotive and transportation, chemicals, materials and food, commercial aviation, consumer products, energy and power systems, environment and building technologies, healthcare, industrial automation and electronics, industrial and machinery, and technology, media and telecom. We have agreed to pay a fee of RMB530,000 to Frost & Sullivan in connection with the preparation of the Frost & Sullivan Report. We have extracted certain information from the Frost & Sullivan Report in this section, as well as in the sections headed "Summary", "Risk Factors", "Business", "Financial Information" and elsewhere in this document to provide our potential **[REDACTED]** with a more comprehensive presentation of the industry in which we operate.

RESEARCH METHODOLOGY

During the preparation of the Frost & Sullivan Report, Frost & Sullivan collected, analyzed, assessed and validated the information and statistics using its in-house analysis models and techniques. Primary research was conducted via discussions and interviews with industry participants and industry experts. Secondary research involved analysis of market statistics obtained from several publicly available data sources, such as releases from the governments of the research countries, company reports, independent research reports and Frost & Sullivan's own internal database. The methodology applied by Frost & Sullivan is based on information and statistics gathered from multiple levels and allows such information and statistics to be cross-referenced for accuracy.

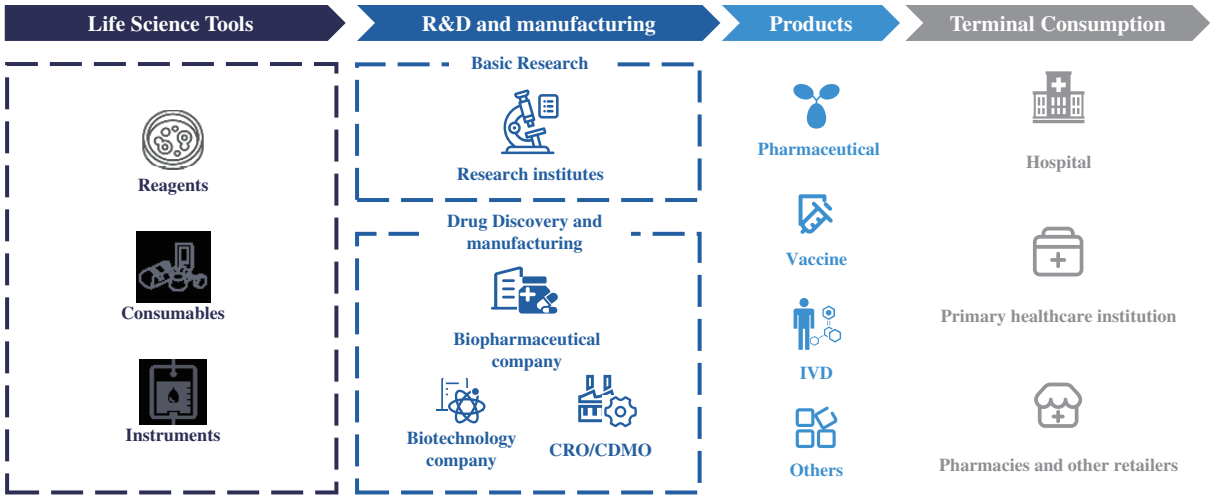
BASIS AND ASSUMPTION

The Frost & Sullivan Report contains a series of market projections which were produced based on the following assumptions, without limitations: China's and global social, economic, and political environment is likely to remain stable from 2025 to 2030.

OVERVIEW OF LIFE SCIENCE INDUSTRY

The life sciences industry integrates expertise from biology, chemistry, pharmacology, mechanical automation, materials science, and other fields to deliver bioprocessing solutions, laboratory products and services, and healthcare products and services, including pharmaceuticals, vaccines, in vitro diagnostics (tests done on samples such as blood or tissue that have been taken from the human body),

among others. We are rooted in the life sciences industry and provide life science tools to serve biopharmaceutical companies, scientific research and the broader biotechnology industry. The following diagram illustrates the value chain of the life science industry.



Source: Frost & Sullivan Report

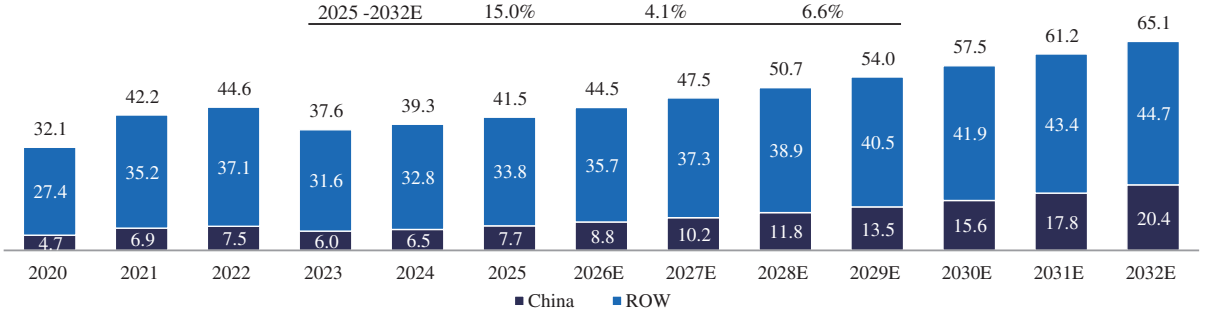
Overview of Life Science Tools Market

The life science tools market refers to the foundational research materials and technical support systems that serve scientific research, biopharmaceutical R&D and manufacturing, diagnostics and the broader biotechnology industry, including instruments, reagents, consumables. The global life science tools market reached USD32.1 billion in 2020 and grew at a CAGR of 5.3% to reach USD41.5 billion in 2025. This market is expected to expand further to USD65.1 billion by 2032, with a CAGR of 6.6% from 2025 to 2032. The decline in market size in 2023 was primarily due to supply constraints of bioprocessing caused by the COVID-19 pandemic. During the pandemic, the market heavily stockpiled these materials, and destocking began in 2023. As the market returned to a normal procurement rhythm after 2024, growth momentum was significantly strengthened. This recovery was driven by the high-speed growth stemming from China's pharmaceutical industry transitioning towards innovation, the continuous expansion of R&D demand for biologics and emerging therapies, as well as technological advancements in areas such as recombinant proteins and supportive policies, all of which fueled the rebound in growth rates. Comparably, China's life science tools market reached USD4.7 billion in 2020 and grew at a CAGR of 10.1% to USD7.7 billion in 2025. This market is projected to reach USD20.4 billion by 2032, with a CAGR of 15.0% from 2025 to 2032. From 2020 to 2023, affected by the pandemic, the Chinese market experienced an initial phase of growth followed by a destocking trend. Since 2024, as the market has gradually recovered from the pandemic and returned to normal procurement dynamics, China's pharmaceutical industry has been undergoing a rapid transformation towards innovation. Against the backdrop of increasing market demand and policy support for basic pharmaceutical research and manufacturing, this transformation is expected to drive the life sciences tools market to achieve a higher CAGR for the period from 2025 to 2032 as compared to the period from 2020 to 2025. The following chart illustrates market size of the global and China's life science tools markets from 2020 to 2032:

Unit: Billion USD

Global and China Life Science Tools Market, 2020 -2032E

Period	CAGR		
	China	ROW	Global
2020 -2025	10.1%	4.3%	5.3%
2025 -2032E	15.0%	4.1%	6.6%



Source: The Company's Annual Reports, Expert Interviews, Frost & Sullivan Report

Growth Drivers and Development Trends of Life Science Tools Market

The key growth drivers of life science tools market are set forth below:

- *Policy Guidance and Government Support:* FDA published its final rule on Laboratory Developed Tests (LDTs) on May 6, 2024, debating the balance between patient safety and quality and innovation which drives cutting-edge and potentially life-saving diagnostics. According to China's "14th Five-Year Plan for Bioeconomic Development," it has been assigned a foundational supporting role in safeguarding cutting-edge research, enhancing biotechnology-driven agriculture and strengthening national biosecurity capabilities. This strategic shift sends a clear signal for independent innovation in core technological tools and industrial upgrading, driving the tools market to evolve from a supportive role in R&D toward becoming strategic infrastructure that empowers the entire bioeconomy ecosystem.

- *Research Strength of Institutions and Universities:* Total global R&D expenditures reached approximately USD3.1 trillion in 2022, with a real-term increase of nearly 200% since 2000. China's scientific research capabilities and technology transfer continue to improve steadily. In 2023, China ranked among the top 15 countries in the Global Innovation Index. The emergence of high-quality innovation creates urgent demand for high-performance, high-specificity tools, offering structurally driven growth opportunities for tool companies with technological advantages. The emergence of AI technology has accelerated the design and development of drug structures, especially the discovery, design and expression of protein structures in biopharmaceuticals. This acceleration in drug development has led to an increased demand for upstream life science tools, particularly reagents such as recombinant proteins and antibodies.

- *Expanding Market Demand and Industrial Development:* Demand for life science tools is underpinned by long-term structural factors, including population aging and rising health awareness, which continue to stimulate sustained investment in life science research and biotechnological innovation. At the same time, closer integration between scientific research and industrial application is accelerating the translation of discoveries into commercial drugs and therapies. This trend enables life science tool providers to become more deeply embedded in customers' innovation pipelines, supporting their transition toward higher-value products and more integrated, solution-oriented offerings.

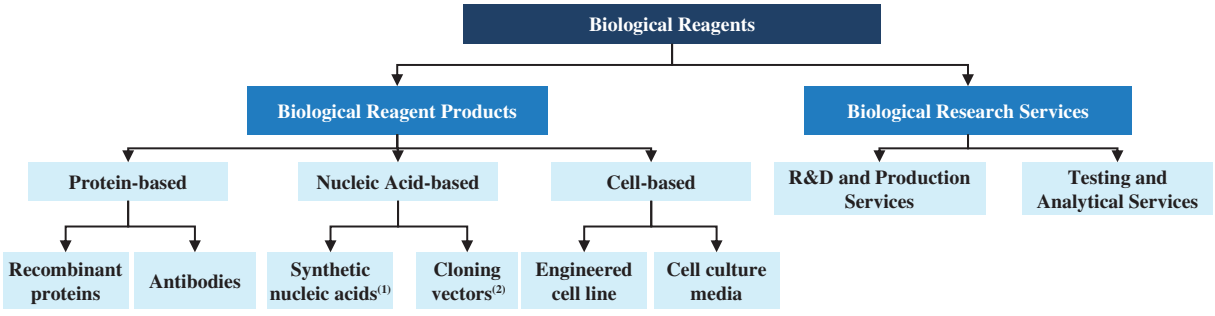
The development trends of life science tools market include:

- *Policy Support and Institutional Optimization:* Continued government investment is expected to provide stable, long-term funding for both basic and applied research, supporting predictable demand for life science tools. At the same time, improvements in research evaluation and stronger intellectual property protection are encouraging tool companies to invest more confidently in long-term R&D and product innovation.
- *Technological Innovation and Breakthroughs:* China's life science research is rapidly advancing in areas such as gene editing, stem cell therapy (a medical treatment that uses stem cells to repair, replace, or regenerate damaged tissues or organs in the body) and immunotherapy, supported by new tools such as single-cell sequencing (a genomic technique that analyzes the genetic material of individual cells, rather than pooling data from many cells together). At the same time, the growing use of AI in research is improving target identification, molecule screening and precision-medicine development, creating demand for more integrated and higher-value tool solutions.
- *Interdisciplinary Integration and Comprehensive Research:* The growing integration of life sciences with physics, chemistry and computational sciences is creating broader demand for advanced tool platforms, including high-precision imaging and novel molecular probes. At the same time, the shift toward system-oriented and multi-dimensional research requires more comprehensive tools and services capable of supporting complex, multi-dimensional data analysis.
- *Industrialization and Commercialization Development:* The acceleration of scientific breakthroughs is increasing the emphasis on technology transfer and industrial application, supporting faster growth in biopharmaceuticals, biotechnology, medical devices and research reagents. As commercialization strengthens, more capital and resources are flowing into life science R&D, deepening the connection between scientific innovation and industrial development.

OVERVIEW OF BIOLOGICAL REAGENTS MARKET

The biological reagents market is a subset of the life science tools market. Biological reagents are substances used in life science research, manufacturing quality inspection and diagnostics to study, detect, manipulate, or analyze biological systems. In terms of biological research services, such services are customized product R&D and manufacturing provided by biological reagent companies to meet clients' specific research needs, or quality control and analytical testing conducted at particular experimental stages to support the client's scientific objectives. The chart below sets forth the basic market segmentation:

Biological Reagents Market: Market Segmentation



Notes:

(1) Artificially designed and chemically synthesized DNA or RNA molecules.

(2) DNA molecules used as carriers to introduce foreign genetic material into a host cell for replication and expression.

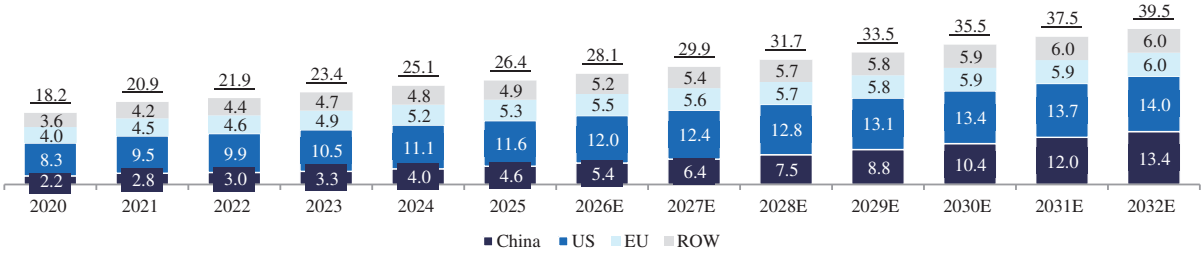
Source: Frost & Sullivan Report

The global and China's biological reagents markets reached USD18.2 billion and USD2.2 billion in 2020 and grew at a CAGR of 7.7% and 16.2% to reach USD26.4 billion and USD4.6 billion in 2025, respectively. The markets are projected to expand further to USD39.5 billion and USD13.4 billion by 2032, with a CAGR of 5.9% and 16.8% from 2025 to 2032. The following chart illustrates the historical and forecast market size of the global and China's biological reagents markets from 2020 to 2032:

Unit: Billion USD

Global and China Biological Reagents Market, 2020 -2032E [1]

Period	CAGR				
	China	US	EU	ROW	Global
2020 -2025	16.2%	6.8%	5.6%	6.1%	7.7%
2025 -2032E	16.8%	2.8%	1.7%	3.0%	5.9%



Source: The Company's Annual Reports, Expert Interviews, Frost & Sullivan Report

Note:

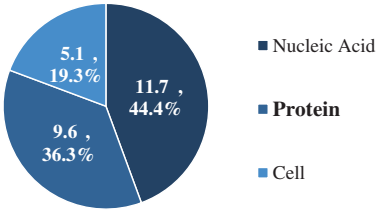
1. Includes only research-grade reagents used by universities, academic and research institutions, hospitals and pharmaceutical companies for teaching, scientific research and R&D projects.

Analysis of the Breakdown of Biological Reagents Market

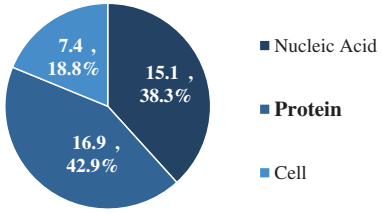
Biological reagents can be categorized into three types, namely, cell-based, protein-based and nucleic acid-based. Protein-based reagents are further divided into antibodies, recombinant proteins and others. In 2025, the protein-based biological reagents segment accounted for 36.3% of overall global biological reagents market in terms of revenue. The global recombinant proteins segment accounted for 36.0% of overall global protein-based biological reagents market in 2025 and to 51.0% in 2032 in terms of revenue. In 2025, recombinant protein reagents accounted for 13.1% of the global biological reagents market, serving as a primary growth engine for the sector. Looking ahead, recombinant proteins are expected to account for an increasing proportion of protein-based reagents and to record the fastest growth among all protein-based reagent categories. The growing share of recombinant protein reagents is primarily driven by technological advancements, which have significantly increased the usage of certain reagents, including enzymes and diagnostic raw materials. The chart below set forth a breakdown of global biological reagents market by product type in terms of revenue in 2025 and 2032:

Unit: Billion USD

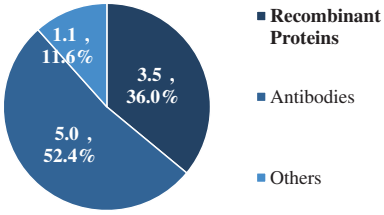
Global Biological Reagents Market by Type, 2025[1,3]



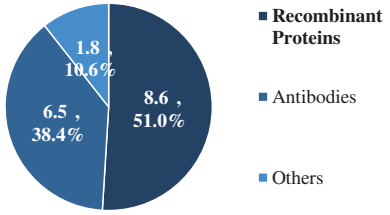
Global Biological Reagents Market by Type, 2032E[1,3]



Global Protein-Based Biological Reagents Market, 2025[1,2]



Global Protein-Based Biological Reagents Market, 2032E[1,2]



Source: The Company's Annual Reports, Expert Interviews, Frost & Sullivan Report

Notes:

1. Includes only research-grade reagents used by universities, academic and research institutions, hospitals and pharmaceutical companies for teaching, scientific research and R&D projects.
2. Others include ELISA protein assay kits and protein microarrays (a high-throughput analytical tool used to study protein interactions, functions and expression profiles on a single platform).
3. Nucleases belong to nucleic acid reagents.

Competitive Landscape of China's Biological Reagents Market

The proportion of top six vendors in China's biological reagents market were 26.6% in 2025 in terms of revenue. We ranked third among all biological reagents providers in China's market with a market share of approximately 2.6% in 2025. The list below sets forth the competitive landscape of biological reagents providers in China's market in terms of revenue in 2025.

Market Share of Biological Reagents Companies in China, 2025[(1)(2)]

Rank	Company	Revenue, Billion RMB	Market Share, %
1	Company A[(3)]	3.2	9.8%
2	Company B[(4)]	2.6	7.8%
3	**Our Company**	**0.8**	**2.6%**
4	Company C[(5)]	0.8	2.5%
5	Company D[(6)]	0.7	2.1%
6	Company E[(7)]	0.6	1.8%
7	Others	23.9	73.4%

Source: Frost & Sullivan Report

Notes:

(1) Includes only research-grade reagents used by universities, academic and research institutions, hospitals and pharmaceutical companies for teaching, scientific research and R&D projects.

(2) Includes the market size of biological reagents sold and manufactured domestically.

(3) Company A is a global leader in serving science, providing analytical instruments, lab equipment, services, diagnostics and life science solutions, based in the US. It was formed in 2006 by the merger of two biotechnology companies (est. 1956 and 1902) and has been listed and traded on the New York Stock Exchange.

(4) Company B was founded in 1668 and based in Germany, focusing on healthcare (medicines), life science (lab supplies) and electronics (specialty materials). Company B is listed on the Frankfurt Stock Exchange.

(5) Company C is a global life science company providing high-quality biological reagents and tools, such as antibodies, proteins and assays, crucial for research, drug discovery and diagnostics, supporting scientists with essential products and technical data. Company C was founded in 1998 and based in the UK, and was acquired by a biotechnology company in 2023.

(6) Company D founded in the PRC, is committed to providing high-quality recombinant protein and antibody reagents and to being a one-stop technical services shop for life science researchers around the world. Company D is listed on the ChiNext Market.

(7) Company E is a leading global supplier of premium life science research reagents, known for high-quality proteins, antibodies, immunoassays (such as ELISAs) and small molecules supporting discovery in cancer, immunology, neurobiology and more. Company E serves as the core brand of a biotechnology corporation, which is based in the US and was founded in 1976.

Key Entry Barriers in Biological Reagents Market

The biological reagents market has high entry barriers due to strict quality standards, continuous innovation needs, strong customer stickiness and the importance of well-developed sales channels. New entrants also face supply chain uncertainty and the need for specialized technical capabilities. The specific entry barriers are set forth below:

- *Stringent Quality Control System:* The core value of biological reagents lies in their activity, specificity and purity. Ensuring consistent quality requires substantial investment in advanced instruments and a professional quality assurance and quality control team to maintain strict batch-to-batch reliability.

- *Sustained Innovation Capability:* As research into disease mechanisms and new therapies progresses, demand is rising for proteins targeting emerging biomarkers. Companies need the ability to rapidly clone, express and purify these novel targets to capture early market opportunities. High-throughput, platform-based workflows enable efficient development and production of a broad protein portfolio, supporting diverse needs across research, manufacturing and clinical applications.

- *High Customer Stickiness:* In long-term research, reagents become closely tied to established protocols, instrument settings and analytical methods. Changing them often requires reoptimizing the entire workflow, which can disrupt data continuity and undermine comparability with past results, risks that academic and industry users are unwilling to take.

- *Sales Network and Channel Development:* Most biological reagents need to be stored and transported at low temperature, which requires companies to build or partner to maintain a reliable end-to-end cold chain system, involving significant capital and operating costs. For the broad and fragmented base of small and medium sized customers, an efficient distributor and agent network is also essential for effective market coverage.

Growth Drivers and Development Trends of Biological Reagents Market

The key growth drivers of biological reagents market are set forth below:

- *Policy Support:* National policies continue to stimulate research investment and innovation, with steady government funding for universities and institutes directly supporting demand for upstream research products such as biological reagents. At the same time, regulatory reforms including the expedited review pathway under Regulations on the Management of Clinical Research and Clinical Translation of New Biomedical Technologies (《生物醫學新技術臨床研究和臨床轉化應用管理條例》) are accelerating the development of biomedicine and cell therapy, further driving sustained growth in demand for related reagents and raw materials.

- *Advances in Scientific Research Technologies:* Breakthroughs in biotechnology, neuroscience and proteomics are increasing demand for high-performance reagents, especially antibody related products used in targeted therapies. At the same time, domestic research capabilities continue to improve as Chinese reagent manufacturers advance molecular diagnostics (a laboratory technique that analyzes biological markers in the genome and proteome to diagnose and monitor diseases, detect risk and guide treatment decisions) and expand their product portfolios, supporting steady market growth.
- *Improvements in Production Processes:* Automation is improving reagent production by enhancing efficiency, consistency and throughput. Growing quality requirements and rising research and industrial investment are also increasing demand for intelligent and centralized production systems that support more reliable and scalable manufacturing.
- *Cultivation of High-Tech Talent:* The expansion of higher education is increasing the supply of trained researchers and laboratory professionals, supporting continued scientific development. At the same time, the shift from labor intensive to knowledge intensive work is improving the efficiency and quality of biological reagent research and manufacturing.
- *AI-Empowered Innovation:* The increasing application of AI in protein and antibody sequence design is accelerating discovery cycles and driving additional downstream wet-lab validation, thereby increasing demand for biological reagents. AI is also increasingly applied to the development and optimization of biological reagents, including culture media and affinity proteins, enhancing their performance and facilitating the development of a broader range of products.

The development trends of biological reagents market include:

- *Domestic Substitution and Overseas Expansion:* Import substitution is accelerating as domestic research and manufacturing capabilities improve, enabling Chinese reagent producers to replace more imported high-end products through competitive pricing and better quality. As local companies reach stronger technological and quality levels, they are also expected to grow their overseas presence by using cost advantages and local innovation to capture new market opportunities.
- *Localized Products and Services:* In the domestic market, companies can develop reagents tailored to local disease models, biomarkers and drug targets while using local manufacturing cost advantages to offer more competitive pricing than imported brands. In overseas markets, success requires understanding local disease profiles, research practices and regulatory requirements, combined with localized production and fast after-sales support to enable more efficient international expansion.
- *Diversified Collaboration and Customization:* Collaborative research models are expanding as reagent companies work more closely with research institutions and industrial users through joint development, CRO services and integrated biopharmaceutical R&D. At the same time, demand for customized reagents is rising as precision medicine and targeted therapies require tailored recombinant proteins, antibodies and cell or gene products for specific research and clinical needs.
- *Platform-Based R&D Development:* Advances in automated manufacturing and integrated quality systems are allowing reagent companies to scale more efficiently while maintaining consistent performance and reliability. At the same time, leading companies are building broader research ecosystems, moving from single product suppliers to integrated platforms that combine reagent development, analytical testing and technical services to strengthen innovation and competitiveness.

OVERVIEW OF RECOMBINANT PROTEIN REAGENT MARKET

Recombinant proteins are proteins produced via genetic and cellular engineering technologies, derived from biological sources. Specifically, living cells can synthesize and assemble proteins according to the provided genetic templates ("**DNA**"). Unlike proteins, DNA sequences can be readily synthesized using well-established recombinant technologies. Therefore, the DNA sequence of a specific gene can serve as a template for subsequent protein expression, and the proteins produced from these DNA templates are known as recombinant proteins.

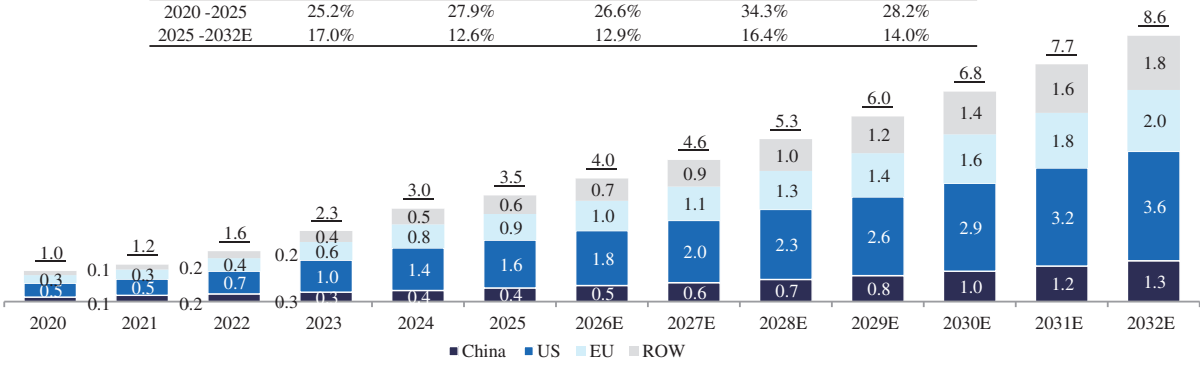
Recombinant protein technology enables the synthesis and regulation of proteins according to their functional roles in cells. Applications span from functional research to large-scale production for structural analysis and drug development. Recombinant protein reagents mainly serve two types of customers. The first type of customers includes academic and research institutions or university laboratories oriented toward fundamental life science research, primarily focusing on biological mechanisms with limited application orientation. The second type of customers consists of biotechnology companies and pharmaceutical enterprises driven by drug discovery and development, conducting research with strong translational and application value to support therapeutic innovation.

The global and China's recombinant protein markets reached USD1.0 billion and USD0.1 billion in 2020 and grew at a CAGR of 28.2% and 25.2% to reach USD3.5 billion and USD0.4 billion in 2025, respectively. The markets are projected to expand further to USD8.6 billion and USD1.3 billion by 2032, with a CAGR of 14.0% and 17.0% from 2025 to 2032. The following chart illustrates the historical and forecast market size of the global and China's recombinant protein markets from 2020 to 2032:

Unit: Billion USD

Global and China Recombinant Protein Reagents Market, 2020 -2032E [1]

Period	CAGR				
	China	US	EU	ROW	Global
2020 -2025	25.2%	27.9%	26.6%	34.3%	28.2%
2025 -2032E	17.0%	12.6%	12.9%	16.4%	14.0%



Source: The Company's Annual Reports, Expert Interviews, Frost & Sullivan Report

Note:

(1) Includes only research-grade reagents used by universities, academic and research institutions, hospitals and pharmaceutical companies for teaching, scientific research and R&D projects.

Competitive Landscape of Global and China's Recombinant Protein Market

The proportion of top four vendors in global recombinant protein market was 38.0% in 2025 in terms of revenue. In global recombinant protein market, we ranked third among all providers and first among all China-based providers with a market share of approximately 2.7% globally.

The list below sets forth the competitive landscape of global and China's recombinant protein reagents market in terms of revenue in 2025.

Market Share of Global Recombinant Protein Reagents Companies, 2025[1]

Rank	Company	Revenue, Billion USD	Market Share, %
1	Company E[5]	0.7	20.0%
2	Company A[3]	0.4	13.0%
3	**Our Company**	**0.1**	**2.7%**
4	Company B[4]	0.1	2.3%
5	Others	2.1	62.0%

Market Share of Recombinant Protein Reagents Companies in China, 2025[2]

Rank	Company	Revenue, Billion RMB	Market Share, %
1	Our Company	0.7	21.9%
2	Company E[5]	0.3	10.3%
3	Company D[6]	0.3	10.0%
4	Company A[3]	0.3	9.4%
5	Others	1.5	48.4%

Source: Frost & Sullivan Report

Notes:

(1) Excludes recombinant protein diagnostic reagents used in industrial production.

(2) Includes export revenue from Chinese enterprises.

(3) Company A is a global leader in serving science, providing analytical instruments, lab equipment, services, diagnostics and life science solutions, based in the US. It was formed in 2006 by the merger of two biotechnology companies (est. 1956 and 1902) and has been listed and traded on the New York Stock Exchange.

(4) Company B was founded in Germany, focusing on healthcare (medicines), life science (lab supplies) and electronics (specialty materials). Company B is listed on the Frankfurt Stock Exchange.

(5) Company E is a leading global supplier of premium life science research reagents, known for high-quality proteins, antibodies, immunoassays (such as ELISAs) and small molecules supporting discovery in cancer, immunology, neurobiology and more. Company E serves as the core brand of a biotechnology corporation, which is based in the US and was founded in 1976.

(6) Company D founded in the PRC, is committed to providing high-quality recombinant protein and antibody reagents and to being a one-stop technical services shop for life science researchers around the world. Company D is listed on the ChiNext Market.

Key Entry Barriers in Recombinant Protein Market

The industry barriers to the development and commercialization of recombinant proteins span technical, economic and regulatory challenges, including enhancing cost-effectiveness, developing high-barrier specialty products, implementing localized strategies and establishing portfolio strategy.

- *Cost-effectiveness Barrier:* Leading companies have built high throughput protein expression and purification platforms that significantly lower the average R&D cost per protein. With mature large scale cell culture and purification systems, the unit cost of producing each batch at scale is far lower than that of small-scale production, further improving overall cost efficiency.
- *Customization Strategy:* Companies now provide not only standard protein products but also customized protein services, analytical testing, assay kit development and other value-added solutions to address specific customer needs. By offering integrated solutions and complete workflows, competition shifts from single product performance to a broader comparison of system capabilities, service quality and overall ecosystem strength.
- *Localized Insights:* Life science research priorities and disease profiles vary by region. The ability to rapidly respond and develop proteins targeting these region-specific biomarkers is key to winning local customers. Industry participants' deep insights into and accumulated experience in the local recombinant proteins market have established their unique competitive advantages and barriers to entry in the region.
- *High-Barrier Specialty Domain:* Developing technically challenging proteins, such as membrane proteins, multi-subunit complexes and viral proteins, requires advanced expression and purification capabilities to maintain proper activity and structure. Mastery of these difficult targets creates a meaningful technical barrier, allowing companies to distinguish themselves from commoditized competitors and build a strong technology-driven brand.

Growth Drivers and Development Trends of Recombinant Protein Market

The key growth drivers of recombinant protein market are set forth below:

- *Innovation in Biopharmaceutical Therapies:* China's strategic policies, including the Strategic Emerging Industries Catalogue and the national plans for biotechnology innovation, prioritize new vaccines, antibody development and immunotherapy, all of which rely heavily on recombinant protein technologies and drive reagent demand. Growing capital investment in biopharmaceutical research, especially in oncology and immune diseases, is also accelerating early-stage drug development, where recombinant target proteins play a central role, further supporting market growth.
- *Advancing Technological Capabilities:* Advances in scientific equipment and experimental methods are enabling deeper study of biological mechanisms and increasing demand for protein related reagents in life science research. Improvements in protein expression, purification and analytical technologies are also enhancing protein activity and yield, supporting both basic research and applied drug development.
- *Expanding Downstream Market Demand:* Policy reforms that encourage collaboration between universities and industry are promoting technology transfer and creating additional demand for biological reagents. Growing public health needs and recurring virus-related emergencies are also increasing focus on viral protein research and therapeutic antibody development, further expanding the market for recombinant protein reagents.

The development trends of recombinant protein market include:

- *Product Quality and Integrated Solutions*: Rising competition is increasing the importance of high product quality and stable performance as the core foundation for long-term growth in recombinant protein reagents. Companies are placing greater emphasis on customer needs by designing products suited to both research and industrial applications, strengthening brand

recognition. At the same time, the market is shifting from single product sales to integrated service models that combine research support, technical assistance and application guidance, helping improve customer loyalty and overall service value.

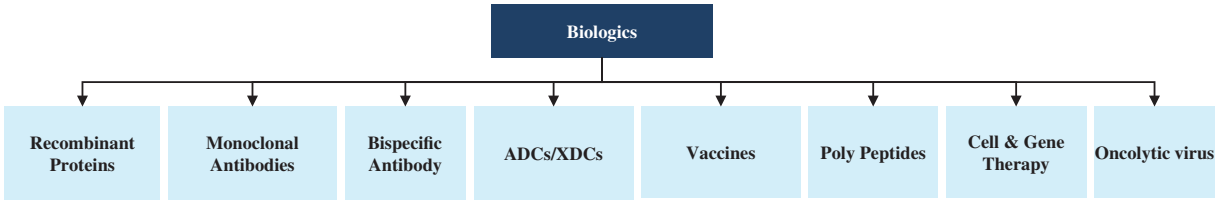
- *Technology Platforms Driving New Product Development:* Continuous improvements in research equipment and experimental platforms are strengthening China's capabilities in protein expression, purification and analysis, supporting faster technological upgrading. Growing R&D investment and the development of integrated innovation platforms across molecular biology, cell culture, purification and analytical technologies are enabling the launch of more high performance recombinant proteins. At the same time, strong momentum in antibody drugs, vaccines and immunotherapy is increasing the need for high-quality recombinant protein reagents, driving ongoing product innovation and refinement.
- *Downstream Collaboration and Coordinated Innovation:* Policies that encourage collaboration between academia and industry are enabling research institutions to take a more active role in industrial R&D. Stronger links among research institutes, reagent producers and pharmaceutical companies are creating a more coordinated innovation ecosystem that improves efficiency from discovery to application. As domestic enterprises enhance their technological capabilities and quality control, import substitution is gaining momentum, expanding local market share and supporting sustainable industry growth.

OVERVIEW OF BIOLOGICS MARKET

As the downstream market of the biological reagents market in which we operate, the expansion of the biologic drug industry is a major driver of growth in the biological reagents market. Biologic drug R&D relies heavily on high-quality reagents for target discovery, mechanism studies, process development, analytical testing and quality control. As downstream fields such as antibody drugs, XDCs/ADCs and cell and gene therapies continue to grow in scale and complexity, their increasing need for specialized reagents directly stimulates demand for upstream products. This strong dependence on biological reagents positions the upstream market as an essential foundation for innovation across the entire biologics industry and supports sustained market growth.

The chart below sets forth the basic segmentation of biologics market:

Biologics Market: Market Segmentation, Global



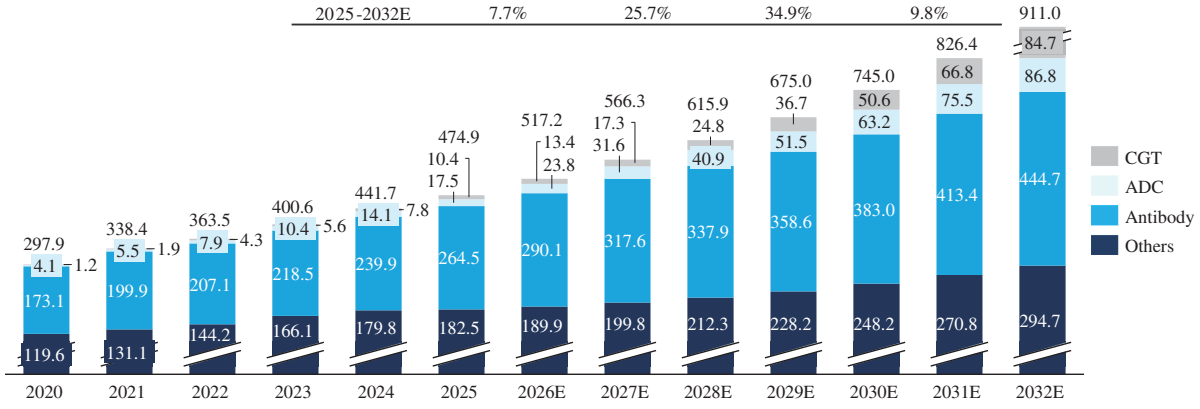
Source: FDA, Frost & Sullivan analysis

Driven by factors such as rising healthcare demand and an increasingly robust regulatory framework, the biopharmaceutical market is growing at a CAGR significantly higher than the average growth rate of the overall pharmaceutical market from 2020 to 2030. The global biologics market reached USD474.9 billion in 2025 and is projected to reach USD911.0 billion by 2032, representing a CAGR of 9.8%. Comparably, benefiting from enhanced healthcare reimbursement capacity and an expanding patient population, the biologics market in China reached RMB523.9 billion in 2025. China's market is projected to grow further to RMB1,275.3 billion by 2032, at a CAGR of 13.6%. The following charts illustrate the historical and forecast market size of the global and China's biologics markets from 2020 to 2032:

Global Biologics Drug Market, 2020 -2032E

Unit: Billion USD
At Wholesale Price Level

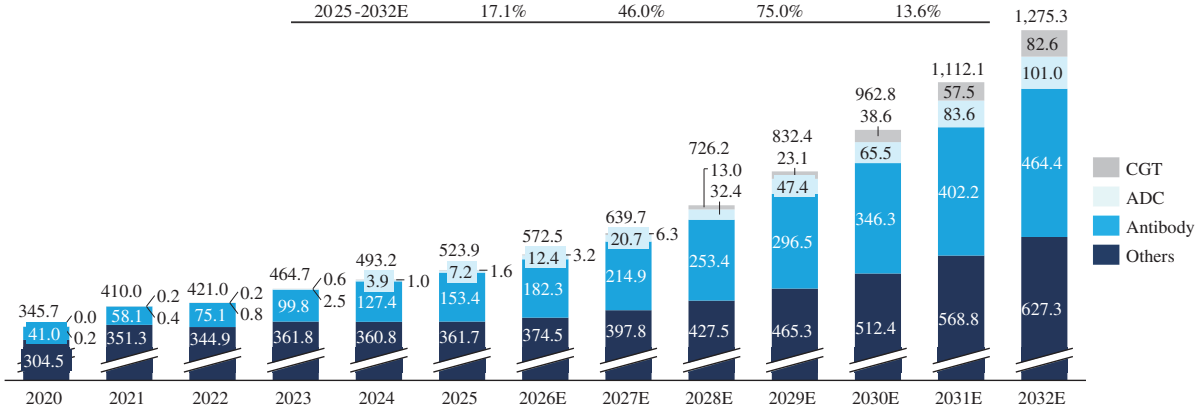
Period	CAGR			
	Antibody	ADC[1]	CGT	Total
2020 -2025	8.9%	33.9%	54.7%	9.8%
2025 -2032E	7.7%	25.7%	34.9%	9.8%



Biologics Drug Market in China, 2020 -2032E

Unit: Billion RMB
At Ex-Factory Price Level

Period	CAGR			
	Antibody	ADC[1]	CGT	Total
2020 -2025	30.2%	113.5%	106.9%	8.7%
2025 -2032E	17.1%	46.0%	75.0%	13.6%



1. Currently, there are no biologics other than ADCs approved within the XDC category.

Source: The Company's Annual Reports, Expert Interviews, Frost & Sullivan Report

Note:

(1) The difference in price definitions between the global and Chinese markets is primarily attributable to variations in their respective pharmaceutical business models. Globally, the wholesale price refers to the price at which pharmaceutical companies sell drugs directly to downstream wholesalers. In China, the ex-factory price is defined as the company's cost plus a reasonable profit margin. Although these terms differ in nomenclature, they essentially reflect the direct pricing of pharmaceutical products by manufacturers.

Overview of the Biologics Market by Drug Type

Antibody Drugs

Monoclonal antibody drugs (treatments based on laboratory-engineered proteins designed to mimic the natural antibodies produced by immune system) offer significantly higher clinical value compared with traditional chemical drugs due to their strong specificity and high affinity for target antigens, making them essential in disease diagnosis and treatment, particularly in oncology.

China's aging population and the rising incidence and mortality of tumors continue to drive strong demand for monoclonal antibodies across applications such as preventive vaccines, hormone deficiency treatments, molecular diagnostics and tumor therapy. The global oncology drug market is already dominated by antibody therapeutics, and ongoing technological advances are enabling the constant emergence of new targets, new antibody formats and antibody drug conjugates. As a result, antibody drugs, especially those used in tumor treatment, are expected to maintain substantial growth potential in the years ahead.

ADC Drugs

Antibody drug conjugates, or ADCs, are complex therapeutic molecules consisting of a monoclonal antibody linked to a biologically active anticancer agent. The antibody component selectively binds to antigens expressed on target cells, ensuring precise delivery of the cytotoxic drug. After binding, the ADC is internalized into the cell, where the active drug is released and induces cell death, enabling effective tumor killing while minimizing systemic exposure.

By combining a highly specific targeting molecule with a potent drug conjugate, the X-drug conjugates ("**XDC**") model enables accurate identification and elimination of tumor cells using smaller drug doses, while achieving improved therapeutic outcomes and reduced systemic toxicity. This targeted mechanism positions XDCs as an important advancement in next generation oncology therapeutics.

Cell and Gene Therapy ("CGT")

CGT integrates gene-based and cell-based therapeutic approaches to achieve disease modifying or potentially curative outcomes. Gene therapy treats disease by altering genetic material, either in vivo through direct delivery into the body or ex vivo by modifying cells outside the body and reinfusing them. Cell therapy introduces living cells, such as stem cells or engineered immune cells, to repair tissue, regulate immune responses, or target cancer.